Great Computing

For more than five decades, Computation has provided the big platforms, complex software, and trained support that are essential to Laboratory missions and programs. In response to programmatic needs, the nation's next-generation supercomputers — ASC Purple and BlueGene/L — are already running at LLNL.

ASC Purple, the world's first supercomputer designed for 100 teraflops (a trillion, or 10^{12} floating point operations/second, abbreviated TF), is a massive cluster of more than 12,000 IBM POWER5 microprocessors, with 50 terabytes of memory, and two petabytes of disk storage.

Even faster, BlueGene/L performs up to hundreds of teraflops/second. BG/L is built on a cellular architecture, meaning the basic building block of the system can be replicated without bottlenecks as the system scales up to 360 TF. It has 2^{16} or 65,536 compute nodes with two processors per node.

To house these and future supercomputers, our new Terascale Simulation Facility (TSF) features a machine floor with two 128-foot x 192-foot computer rooms, providing 49,000 square feet (nearly a football field) for ultracomputing.

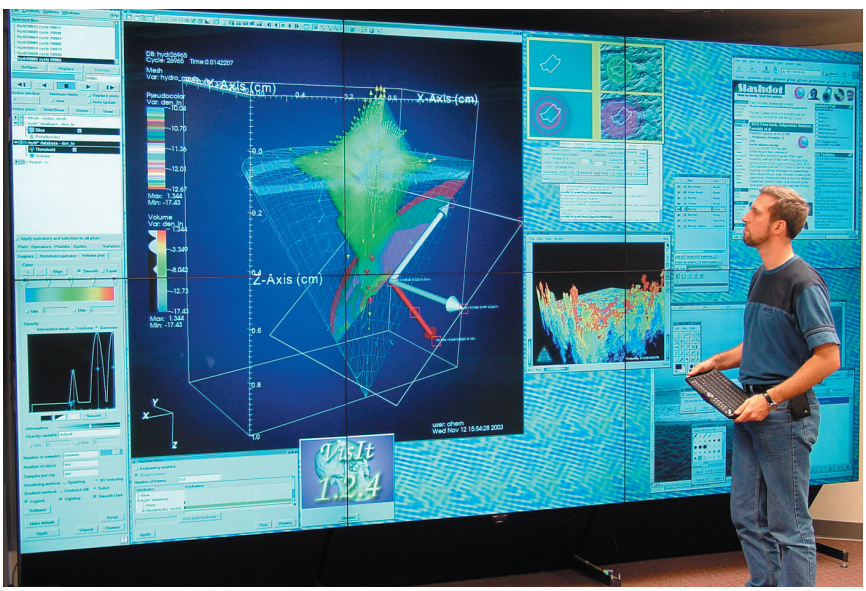
TSF also accommodates a consolidated high-performance network plant providing scalable system area networks that facilitate the smooth exchange of data among computing resources, scientists, and the visualization assessment theater.

Great computing can't exist without great infrastructure, so LLNL implements leading-edge practices in networking, security, computing services, communication services, and authentication and authorization technologies.

Distance computing on parallel high-performance computers (HPC) can be complicated. We provide expert consulting and documentation for our shared HPC machines. Our support teams assist local researchers as well as those across the country and around the world.

Additional specialized projects and working groups advance the state of the art in

- Linux kernel and cluster tools development
- Systems administration
- Computer, network, and information security
- Advanced networking technologies
- High-performance parallel storage
- Parallel computing environments



The PowerWall is a visualization tool for displaying data calculated by simulations run on Lab supercomputers. This simulation shows the density analysis of a National Ignition Facility test target under laser bombardment. The smaller vectors indicate velocities of the target material.

The Terascale Simulation Facility allows researchers to develop the technologies and systems to move scientific supercomputing to the petascale level.

http://www.llnl.gov/comp/opportunities/

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